Warm-up
(Complete the following problems in notebook or on homework page.)

1. 2, 4, 12, 48, 240, __?__ ×6 1440

2. -5, -10, -20, -40, __?__ ×2 −80

3. Determine if the conjecture is true or false, if false provide a counterexample.
Given: $\angle 3 \text{ and } \angle 4$ are supplementary
$\angle 3 \text{ and } \angle 5$ are supplementary
Conjecture: $\angle 4 \cong \angle 5$

2-2 Logic

Statement-Sentence that is either true or false, but not both

Truth value-whether it is true or false

Negation-opposite meaning as well as opposite truth value (Symbol ~)

Example:
p: September has 30 days. T

not p or $\sim p$:
Sept. does not have 30 days.

(The letters p, q, and r are typically used to represent statements.)

Compound statement-- combine 2 or more statements using AND + OR

q: September is the 9th month of the year.

p and q:

Sept. has 30 days and is the 9th month of the year.

AND-conjunction Symbol $\wedge$ $p \wedge q$ "p and q"

True, when BOTH statements are true

False, when either statement is false or both false

r: A square has 4 congruent sides.

True or False

$p \wedge q$ T (T T) $p \wedge r$ T (T T) $\sim p \wedge r$ False (F T)

OR-disjunction Symbol $\vee$ $p \vee q$ "p or q"

True, when either statement is true or both true

False, when BOTH statements are false

True or False

$p \vee q$ T (T T) $\sim p \vee \sim r$ F (F F) $\sim q \vee r$ T (F T)

Complete the following example on your own.

F p: $\overline{AB}$ is proper notation for "line AB"

T q: centimeters are metric units

F r: 9 is a prime number

Determine the truth value for #s 1-5.

1. $p \vee q$ T (F T)
2. $r \vee q$ T (F T)
3. $p \wedge q$ F (F T)
4. $\sim p \vee q$ T (T T)
5. $p \vee r$ F (F F)

Truth Tables

Negation	
p	~p
T	F
F	T

Conjunction		
p	q	p∧q
T	T	T
T	F	F
F	T	F
F	F	F

Disjunction		
p	q	p∨q
T	T	T
T	F	T
F	T	T
F	F	F

Tautology-Compound sentence that is always true.
Ex: You are in school, or you are not in school.

~p ∨ q

p	q	~p	~p∨q
T	T	F	T
T	F	F	F
F	T	T	T
F	F	T	T

~p ∧ ~q

p	q	~p	~q	~p∧~q
T	T	F	F	F
T	F	F	T	F
F	T	T	F	F
F	F	T	T	T

3 Terms

p ∨ (~q ∧ r)

p	q	r	~q	(~q∧r)	
T	T	T	F	F	T
T	F	T	T	T	T
T	T	F	F	F	T
T	F	F	T	F	T
F	T	T	F	F	F
F	F	T	T	T	T
F	T	F	F	F	F
F	F	F	T	F	F

(p ∨ q) ∧ ~r

p	q	r	~r	(p∨q)	
T	T	T	F	T	F
T	F	T	F	T	F
T	T	F	T	T	T
T	F	F	T	T	T
F	T	T	F	T	F
F	F	T	F	F	F
F	T	F	T	T	T
F	F	F	T	F	F

HW
p72-73
18-29(T or F only),
30-32